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 (72) Inventor: ROBERT JOHN ROWLEY

(19)



(54) ROAD VEHICLE SUSPENSION.

(71) We CRANE FRUEHAUF LIMITED, of South Green, Dereham, Norfolk NR19 1HE, a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a road vehicle suspension of the class incorporating air springs for driving wheels carried on an axle housed within a casing and mounted transversely of the vehicle. It provides such a suspension which is particularly suitable for the driving wheels of a goods vehicle.

According to this invention, in a road vehicle suspension of the class referred to, wherein the air springs for a pair of driving wheels depend from the vehicle chassis and are connected at their ends remote from the chassis by a transverse stabilising member, the axle casing is mounted on longitudinally-extending leaf springs having ends respectively secured to the stabilising member and connected to the chassis, and guides are provided on the chassis and on the springs intermediate their ends which cooperate to limit axle displacement transversely of the vehicle.

The suspension as just set forth is intended to give improved road running characteristics, for example when cornering, and to be capable of being fitted to a vehicle without major redesign of chassis components.

In one particular construction the axle casing is mounted adjacent each end on a single such leaf spring and each such leaf spring has associated with its an auxiliary leaf spring which has its one end at the chassis connection of the leaf spring and is secured adjacent its other end to the axle casing and which is constructed to include a guide cooperating with a chassis-mounted guide in a manner permitting their relative up and down movement whilst restricting

their relative transverse displacement.

One construction of driving wheel suspension of this invention will now be described by way of example and is shown diagrammatically on the accompanying drawings in which:—

Figure 1 is a side elevational view, from one side of the vehicle chassis, of the suspension and part of a chassis longitudinal member;

Figure 2 is a sectional view taken transversely of the vehicle along the line 2-2 of Figure 1; and

Figure 3 is an end view of Figure 1 in the direction of arrow 3 of Figure 1 but of the air spring on the other side of the chassis from that shown in Figures 1 and 2.

The suspension illustrated is suitable for the driving wheels of a goods vehicle, the axle casing 10 being as usual below the chassis longitudinal members 11 (Figures 1 and 2) and 12 (Figure 3) and extending transversely of the vehicle. The suspension shown comprises air springs 13, 14 (Figures 1 and 3) which are connected between brackets 15, which are on the outboard sides of the longitudinal members 11, 12, and respective ends of a transverse stabiliser and torque tube 16. The usual shock absorbers 17 extend between brackets 18, 19 on the torque tube 16 and a transverse chassis member 20 respectively.

The suspension further includes a leaf spring arrangement (Figures 1 and 2) which comprises at each side of the vehicle a main leaf spring 21 and an auxiliary leaf spring 22. Each main leaf spring 21 tapers from the point, at which the axle casing 10 is secured by U-bolts 23 to the springs and the springs are located relatively by location bolt 24, to its forward end which is forged into an eye 21a. The spring 21 may for instance be 3½ to 4 inches wide and may taper from a thickness of 1½ to 2 inches at the axle location to about half this thickness at the eye 21a.

Each main spring 21 has its rear end 21b cranked downwardly and rearwardly where it is firmly secured to the adjacent end of the torque tube 16.

- 5 Each auxiliary leaf spring 22 extends forwardly from the axle location to a forged eye 22a which engages within the eye 21a of the associated main spring and on a standard spring mounting bush 25. Rearwardly of the axle location, the auxiliary spring 22 is cranked upwards to provide at its end an upstanding mount 22b for an angle-section guide 26 which cooperates with a chassis-mounted guide on the outside of the longitudinal chassis member 11 (or 12).

- 15 Each chassis-mounted guide is a pad 27 which faces outwardly and is convex, the pad being at a level higher than the axle centre line and the apex of its convex surface being substantially in horizontal alignment with the centre line of the mounting bolt 28 for the forward end of the springs 21, 22.

- 25 The guides 26 and pads 27 in one convenient form are made from mild steel plates which are surface hardened to a depth of about $\frac{3}{16}$ inch for example by a manganese hardening technique.

- 30 There should be a working clearance of say 1 mm between each guide 26 and its associated pad 27 and the guide 26 must be long enough to cooperate with the pad in all riding positions of the chassis.

- 35 The guides control lateral displacement of the axle relatively to the chassis.

Check straps 29 (Figure 3), chains or cables are provided to limit expansion of the air springs 13, 14 and bump stops limit compression of the springs.

- 40 This arrangement stabilises the chassis and axle when inclination of the vehicle chassis occurs due to side loads when cornering, guides the axle relatively to the chassis and clearly can be adopted without substantial modification of existing chassis components.

WHAT WE CLAIM IS:

1. A road vehicle suspension of the class incorporating air springs for driving wheels carried on an axle housed within a casing and mounted transversely of the vehicle, wherein the air springs for a pair driving wheels depend from the vehicle chassis and

are connected at their ends remote from the chassis by a transverse stabilising member, the axle casing is mounted on longitudinally extending leaf springs having ends respectively secured to the stabilising member and connected to the chassis, and guides are provided on the chassis and on the springs intermediate their ends which cooperate to limit axle displacement transversely of the vehicle.

2. A road vehicle suspension according to Claim 1, wherein the axle casing is mounted adjacent each end on a single such leaf spring, and each such leaf spring which has its one end at the chassis connection of the leaf spring and is secured adjacent its other end to the axle casing and which is constructed to include a guide cooperating with another guide mounted on the chassis in a manner permitting their relative up and down movement while restricting their relative transverse displacement.

3. A road vehicle suspension according to Claim 2, wherein each auxiliary spring has its said other end cranked upwardly to provide a mount for a guide member to cooperate with a chassis-mounted guide.

4. A road vehicle suspension according to Claim 3, wherein the chassis-mounted guide is a pad which faces outwardly and is convex, the apex of the convex surface being at a level higher than the axle centre line and being substantially in horizontal alignment with the centre line of mounting bolts for the forward ends of the springs.

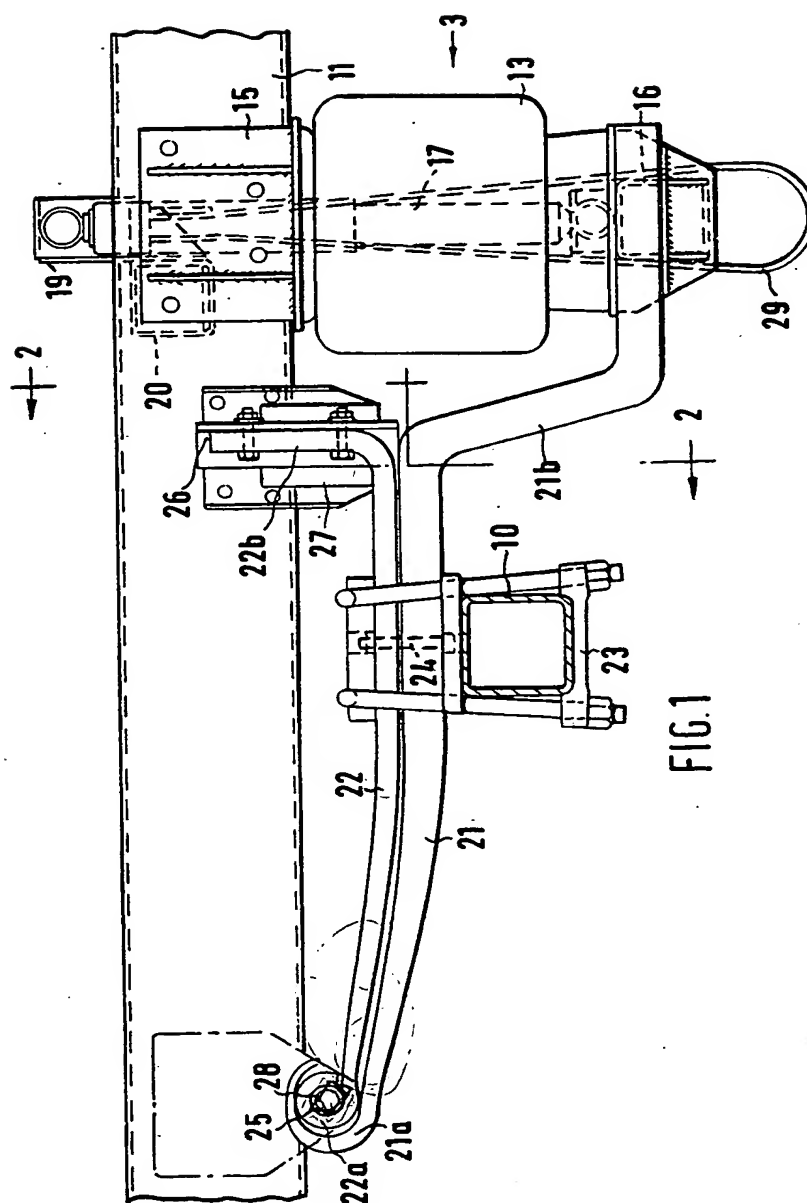
5. A road vehicle suspension according to Claim 3 or Claim 4, wherein the cooperating guides are of mild steel surface hardened to a depth of about $\frac{3}{16}$ inch.

6. A road vehicle suspension according to any of Claims 1 to 6, there being a total transverse clearance of about 2mm in the guides.

7. A road vehicle suspension substantially as hereinbefore described with reference to the accompanying drawings.

Agents for the Applicants
NPM HUGHES CLARK ANDREWS & BYRNE

5, Stone Buildings,
Lincoln's Inn,
London WC2A 3XT



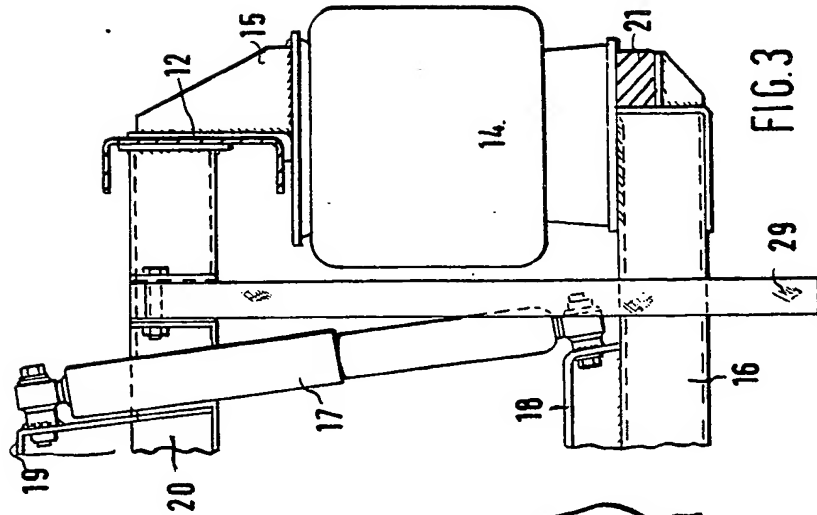


FIG. 3

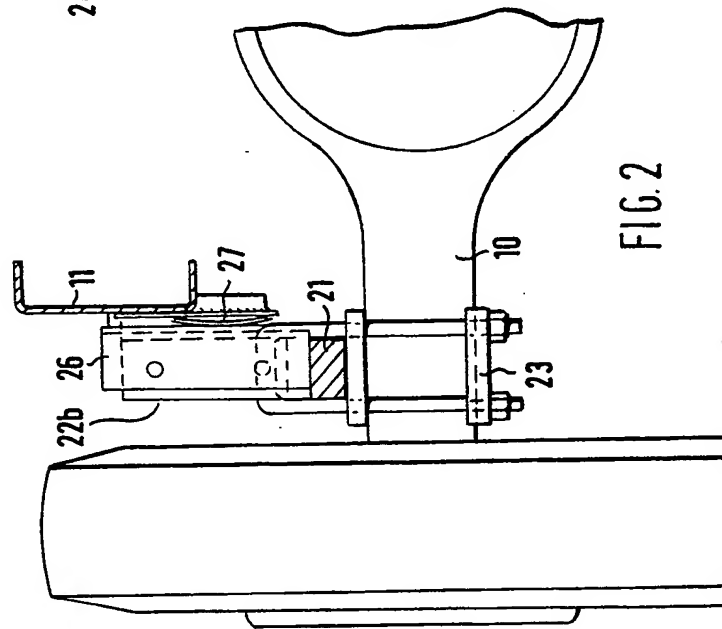


FIG. 2